

Memorial to W.A. “Bill” Cobban (1916–2015)

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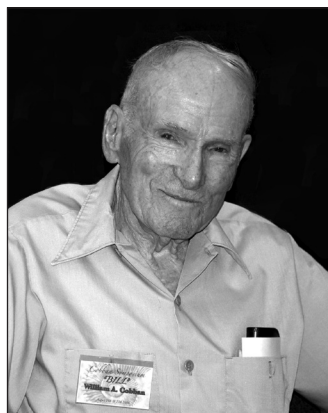
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Dr. W.A. “Bill” Cobban, one of the most highly respected, honored and published geologist-paleontologists of all time, passed away peacefully in his sleep in the morning of 21 April 2015 at the age of 98 in Lakewood, Colorado. Bill was an extraordinary field collector, geologist, stratigrapher, biostratigrapher, paleontologist, and mapmaker who spent nearly his entire life working for the U.S. Geological Survey (USGS). In a career that spanned almost 75 years, he fundamentally changed our understanding of the Upper Cretaceous Western Interior through its fossils, making it known throughout the world.

William Aubrey “Bill” Cobban was born in 1916 near Great Falls, Montana. As a teenager, he discovered a dinosaur in the Kootenai Formation catching the attention of Barnum Brown, premier dinosaur collector at the American Museum of Natural History, where the dinosaur now resides. A few years later, as Bill told, he read about the discovery of fossil bones in Shelby, Montana, during excavation of the Toole County Courthouse. The bones turned out to actually be baculites and other iridescent ammonites. These ammonites made such an impression on Bill they would change his life forever. He attended Montana State University in 1936, where he met a geology professor who encouraged an already developing love for geology and paleontology and received his B.S. in geology in 1940.

Immediately after graduation, Bill went to work for Carter Oil Company (now Exxon) in Shelby as a geologist, stratigrapher, and mapmaker. He married Ruth in 1942 and began a family. During that time, he met John Reeside and Ralph Imlay of the U.S. Geological Survey, who traveled from Washington each summer to do field work in the West. They convinced Bill, in 1946, to pursue his Ph.D. at Johns Hopkins University in Baltimore under the guidance of Harold Vokes, a specialist on fossil molluscs. Bill was able to work on his Ph.D. while being partly and then fully employed by the USGS, and he received his Ph.D. in 1949. The works that emerged from Bill’s dissertation were detailed studies of the ammonites and stratigraphy of the Colorado Group, especially from the Sweetgrass Arch in Montana. Bill produced USGS Professional Paper 239 in 1951 on these scaphitid cephalopods from the Colorado Group



and therein presented one of the best-documented examples of sutural evolution showing the transformation of the first lateral saddle from symmetrically bifid to asymmetrically bifid to asymmetrically trifid to symmetrically trifid.

During his initial years at the USGS, Bill mentored under John B. Reeside, Jr., the father of modern Western Interior biostratigraphy. Working with Reeside, Bill learned firsthand the importance of biostratigraphy and the significance of identifying distinct species from different zones. While at the Survey, he began organizing and cataloguing the collections that he and close friends and colleagues James Gill and Glenn Scott made. These geologists spent their lives collecting, mapping, and publishing on the geology, stratigraphy, and the invertebrate fauna of the Western Interior Upper Cretaceous (Cenomanian-Maastrichtian) marine sediments. The collections that these men assembled are unequaled anywhere and their research defined our ideas of biostratigraphy and ammonite diversity within the marine Western Interior.

Another early landmark publication was Bill's 1960 USGS Professional Paper with John Reeside on the gastropod ammonites of the Mowry Shale. Therein, Bill documented the enormous variation in these ammonites and challenged the traditional notions that ammonite taxonomy emphasized type concepts, instead embracing the concept of biological variation within a species. This idea would form the basis of many of his later works.

For many workers, Bill's 1966 publication with James Gill on the Red Bird Section of the Pierre Shale was one of the most notable in his career. He and Gill succeeded in subdividing the thick, homogenous, black marine shales of this formation into a sequence of identifiable biostratigraphic ammonite zones, which formed the basis of ammonite zonation of the Campanian of the U.S. Western Interior and the standard to which the world tries to correlate. This paper also contained Bill's famous diagrams of the shifting western shorelines of the Western Interior Seaway in Wyoming from the lower Campanian through the lower Maastrichtian.

For scaphite workers, few of Bill's papers compare to his 1969 classic publication on *Scaphites leei* and *Scaphites hippocrepis*. Although sexual dimorphism was a popular theme in ammonite studies for more than a century, particularly with respect to Jurassic ammonites, Bill demonstrated unequivocally the existence of sexual dimorphism in scaphites. Relying on carefully collected specimens and focusing on collections from single concretions, Bill recorded the presence of two morphs for each species, distinguished by differences in the shape of the mature body chamber. This paper resulted in the re-interpretation of scaphite taxonomy and evolution worldwide.

Bill loved working in the Upper Cretaceous of New Mexico. From 1960 to 1990 nearly one third of his papers (135 in this time frame) came from the geology of New Mexico. Topics included stratigraphy (intertongued Dakota/Mancos, Juana Lopez and the Tres Hermanos Formations), correlation (Gallop Sandstone) and systematic paleontology (*Collignonicerias woollgari woollgari* and the ammonite faunas of southwestern New Mexico). The 1989 paper by Cobban, Hook, and Kennedy documented in stratigraphic detail the most diverse, late Cenomanian ammonite fauna in the world—an amazing 31 genera and 64 species! Bill discovered that southwest New Mexico was a key area during the Late Cretaceous because here the coldwater boreal faunas of the Western Interior intermingled with the warm water Tethyan faunas of Europe and Africa, thus providing a means of international correlation.

Cobban and Kennedy's 1976 publication on the aspects of ammonite biology, biogeography, and biostratigraphy was another brilliant work. In this paper Bill enlightened the world with his understanding and ideas of ammonite biology, morphology, mode of life, sexual dimorphism, post-mortem taphonomy and taxonomic problems. He also utilized his great experience in the field to discuss the importance of ammonite fossils in biostratigraphy and their significance in

geographic distribution as well as in Continental Drift. This was the first paper that Kennedy and Bill coauthored but it would not be their last. Over the next 57 years, the two would collaborate on 96 more papers and correlate some faunas from the Western Interior to those of Europe, thus establishing international correlated ages and zones.

Perhaps one of his finest works came in 2006. After a career of collecting, research, and examinations, he and his co-authors produced a masterpiece that will be utilized worldwide by geologists and paleontologists for decades. This opus is an all-in-one culmination of all of Bill's geologic, biostratigraphic, and radiometric work. Entitled *A USGS Zonal Table for the Upper Cretaceous Middle Cenomanian-Maastrichtian of the Western Interior of the United States Based on Ammonites, Inoceramids, and Radiometric Ages*, it compiles the complete, complex zonation of the marine Upper Cretaceous of the Western Interior with their corresponding ages.

During his career, Bill visited and collected more Cretaceous outcrops than any other geologist past, present, or future. From his records he helped create a USGS database that contains over 14,000 Mesozoic mollusk localities from the Western Interior and nearly 1000 other localities he visited in the southern, southeastern, and eastern United States. At every locality, Bill took measurements (whenever possible), collected fossils, and made impeccable notes. His publications showed his uncanny abilities of observation, interpretation, and deduction. Bill shared his knowledge with all those around him and with everyone who visited him in Denver or accompanied him in the field.

Bill is responsible for naming and defining most of the 71 Upper Cretaceous ammonite zones of the Western Interior. Along with colleague John Obradovich, he was able to assign the most accurate and widely accepted Ar/Ar dates to most of the Upper Cretaceous bentonite layers. These zones and their corresponding ages are recognized and used by geologists worldwide as the standard for Upper Cretaceous zonation of the U.S. Western Interior. Bill was involved in the systematic descriptions of hundreds of invertebrate fossils, naming at least 35 genera, 2 subgenera, 215 species, and 11 varieties of ammonites along with 18 species of inoceramids.

Bill was a disciplined researcher who authored and co-authored more than 335 papers on the invertebrates, biostratigraphy, and geology of the North American Late Cretaceous. Bill published 68 papers as the sole author but preferred working with other people. Over a span of more than 70 years, he collaborated with more than 110 other respected geologists and paleontologists worldwide to publish scores of peer-reviewed papers. He continued to publish up to the time of his death.

At the age when most of his peers retire, Bill was really getting started at writing. Most of his papers—more than 200 of them—came after age 65. He continued to drive to work every day and go out in the field until age 95, when he suffered a badly broken arm after falling from a ladder. From then on his life changed. He and his wife would move from their home of more than 65 years into an assisted living facility. Ruth would not last a year, but Bill kept on going, although not to work. Colleagues continued to send him papers to review and co-author that they had been working on prior to his move and he would add his ideas and thoughts, but without regular access to his library and collection, he could no longer do the same work and include the same insight that drove and inspired him for decades.

Bill was also one of the most esteemed paleontologists that ever lived. He had four ammonite genera, one bivalve genus, one plant genus and 18 species of invertebrates named in honor of him. In 1974, he received the Meritorious Service Award, the second-highest departmental honor award that can be granted to a career employee in the Department of the Interior. In 1985, he was awarded the Distinguished Geologist Pioneer Award, which is awarded by the Paleontological Society to recognize outstanding contributions in paleontology. In 1986, he was given the

Distinguished Service Award, the highest departmental honor award that can be granted to a career employee of the Department of the Interior. In 1990, he was awarded the Raymond C. Moore Paleontology Medal by the Society for Sedimentary Geology (SEPM) International, in recognition of "Excellence in Paleontology." In 2004, his peers at the 6th International Symposium on Cephalopods Past and Present honored Bill with a Lifetime Achievement Award for his unselfish, meritorious work on the Late Cretaceous ammonites of North America. In 2006, a paleontological symposium was held at the Colorado School of Mines as a tribute to the life and career of Dr. W.A. "Bill" Cobban. In 2007, he was given the Dallas Peck Award for a lifetime achievement of scientific excellence in the U.S. Geological Survey's geologic division. And in 2011, the Geological Society of America hosted two special symposia dedicated to Bill Cobban at its annual meeting.

Bill was preceded in death by Ruth, his wife of 75 years, both parents, grandson Colt Baird, and close colleagues Jim Gill, John B. Reeside, Glenn Scott, and Jake Hancock. He is survived by his daughter Georgina Egbert, sons Robert and Bill, and by hundreds of close friends and colleagues who were fortunate to have gotten to know him. Dr. Cobban will forever be remembered through his many publications especially and dearly remembered by each and everyone who had the opportunity to visit this great man and the collections he compiled and organized at the Denver Federal Center in Building 810. His field work on the ammonites and geology of the Upper Cretaceous Western Interior will never be equaled; his contributions and insight will be utilized for generations. He left this world a much better place, and all who knew him were enriched by his friendship, patience, wisdom, and knowledge. There was no one quite like Bill, and he will be greatly missed!

For a complete, updated listing of Bill's bibliography, his published genera and species, and genera and species named in honor of him, go to <http://www.aaps-journal.org/pdf/Larson-Cobban-historical-paper.pdf>.

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